

519,124
21 DEC 2004

Rec'd PCT

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
31 December 2003 (31.12.2003)

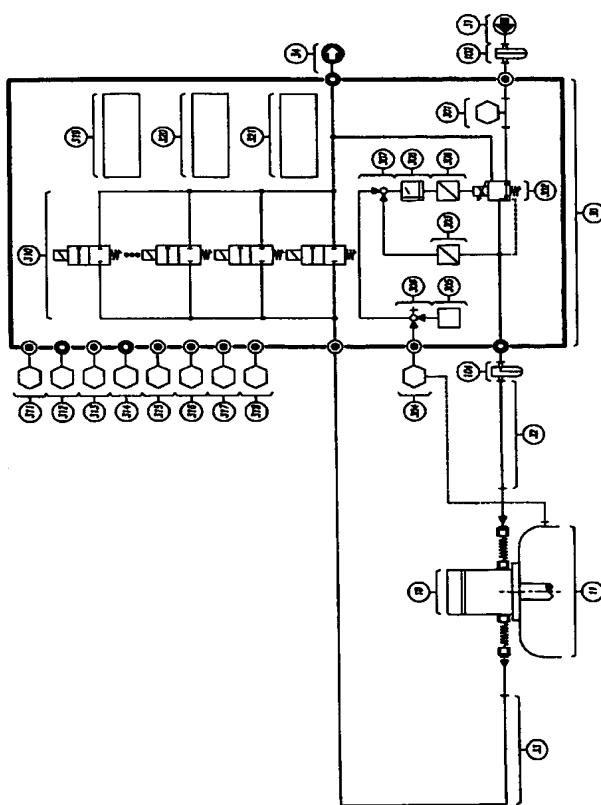
PCT

(10) International Publication Number
WO 2004/001259 A1

- (51) International Patent Classification⁷: F16J 15/34, G01M 13/00
- (21) International Application Number: PCT/IT2003/000154
- (22) International Filing Date: 13 March 2003 (13.03.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
MI2002A001396 25 June 2002 (25.06.2002) IT
- (71) Applicant (for all designated States except US): TERMΟΕΛΕΤΤΡΟΝΙΚΑ S.P.A. [IT/IT]; Via Petrarca 10, I-24052 Azzano S. Paolo (IT).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): COMPER, Riccardo [IT/IT]; Via Petrarca 10, I-24052 Azzano S. Paolo (IT).
- (74) Agent: GARAVELLI, Paolo; A.Bre.Mar. S.r.l., Via Servais, 27, I-10146 Torino (IT).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: MULTIFONCTIONAL ELECTRONIC DEVICE FOR A MECHANICAL SEAL AND CONTROL AND MANAGEMENT PROCESS REALISED BY SUCH DEVICE



(57) Abstract: Multifunctional electronic device (30) based on a microprocessor for checking and managing all operating and diagnostic conditions of a mechanical seal (10, 20). A mechanical seal, installed on pumps or process machines (11, 21), comprises two coupled surfaces, one rotating and integral with a shaft and one stationary and integral with the machine in which the shaft is inserted; these two surfaces are kept in contact through combined forces: a mechanical force generated by springs and another hydraulic force generated by the pressure of a fluid and suitably controlled by a pressure regulator (103, 202, 302). The electronic device regulates the pressurization of a mechanical seal to variable pressure values, keeping the optimum difference (305) constant between pressure (303) inside the mechanical seal and pressure (304) in the pump delivery line or inside the process machine in which the seal is installed.

WO 2004/001259 A1



Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 03/00154

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F16J15/34 G01M13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F16J G01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 01 40756 A (PECHT GLENN G ;CRANE JOHN INC (US); WILLIAMSON GUY GARDNER (US)) 7 June 2001 (2001-06-07) page 5, line 1 -page 6, line 23 page 11, line 21 -page 14, line 24; claims 21-32 ----- A US 4 792 911 A (SNUTTJER OWEN R ET AL) 20 December 1988 (1988-12-20) the whole document ----- -/-	1-5,11, 14,16, 17, 21-24, 27-32 1-7,10, 11,13, 16,17, 21-33, 35,36

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the International search

4 July 2003

Date of mailing of the International search report

11/07/2003

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Sbaihi, M

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 03/00154

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 762 342 A (KAKABAKER KENNETH G ET AL) 9 June 1998 (1998-06-09) column 2, line 17 - line 57 column 6, line 36 - line 61 column 7, line 40 -column 9, line 26; figure 3 -----	1,3-5,31
A	US 6 116 609 A (AZIBERT HENRI V) 12 September 2000 (2000-09-12) column 3, line 2 - line 26 column 13, line 25 - line 67 -----	1

INTERNATIONAL SEARCH REPORT

International Application No PCT/IT 03/00154

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 0140756	A	07-06-2001	AU EP WO US	2254301 A 1290367 A2 0140756 A2 2001030396 A1		12-06-2001 12-03-2003 07-06-2001 18-10-2001
US 4792911	A	20-12-1988	CA DE EP IN JP MX YU	1260061 A1 3765431 D1 0229719 A2 167261 A1 62178135 A 162342 A 4687 A1		26-09-1989 15-11-1990 22-07-1987 29-09-1990 05-08-1987 26-04-1991 30-04-1989
US 5762342	A	09-06-1998	NONE			
US 6116609	A	12-09-2000	US US US US US US AU AU AU EP EP EP JP JP WO WO WO US US US	6131912 A 6068264 A 6059293 A 6068263 A 6155572 A 6076830 A 1924299 A 1925999 A 1931299 A 1038130 A1 1038131 A1 1042626 A1 2002508489 T 2002508490 T 9931412 A1 9931413 A1 9931414 A1 6120034 A 2001010416 A1 6557856 B1 2002096835 A1		17-10-2000 30-05-2000 09-05-2000 30-05-2000 05-12-2000 20-06-2000 05-07-1999 05-07-1999 05-07-1999 27-09-2000 27-09-2000 11-10-2000 19-03-2002 19-03-2002 24-06-1999 24-06-1999 24-06-1999 19-09-2000 02-08-2001 06-05-2003 25-07-2002